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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,846	01/21/2004	Eileen Saidi	VT-2532	5873

33204 7590 10/01/2007

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EXAMINER	
DOVE, TRACY MAE	

ART UNIT	PAPER NUMBER
1745	

MAIL DATE	DELIVERY MODE
10/01/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/762,846	SAIDI ET AL.	
	Examiner	Art Unit	
	Tracy Dove	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 March 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *15 and 18-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *15,18-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the communication filed on 3/28/07. Applicant's arguments have been considered, but are not persuasive. Claims 15 and 18-43 are pending. This Action is FINAL, as necessitated by amendment.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 15 and 18-43 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 15 recites the formula "$LiFe_{1-x}MgPO_4$", which is indefinite. Examiner believes the formula should read "$LiFe_{1-x}Mg_xPO_4$".

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 15, 18-20, 22-24, 31-33 and 35-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al., US 6,723,470 ("Barker470") in view of Barker et al., US 5,643,695 ("Barker 695"), and further in view of Kuboki et al., US 6,413,679.

Barker470 teaches a lithium battery comprising a positive electrode, a counter negative electrode, a separator and an electrolyte. The positive electrode comprises a lithium mixed metal phosphate compound having the formula $LiFe_{1-y}Mg_yPO_4$ (10:25-29). The compound

$LiFe_{0.9}Mg_{0.1}PO_4$ is specifically disclosed (11:39). The compound $Li_3V_2(PO_4)_3$ is specifically disclosed (11:39-40). The electrolyte comprises any number of suitable solvents and lithium salts. Solvents are selected from diethyl carbonate (DEC), ethylmethyl carbonate (EMC), ethylene carbonate (EC) and propylene carbonate (PC). The salt may be $LiPF_6$. Desirable solvents and salts are described in US Patent 5,643,695 (Barker695) (13:3-18). Barker695 teaches a solvent mixture comprising EC and PC with one or more additional solvents included in the solvent mixture. The additional solvents may be MEC, DEC or a mixture of MEC and DEC (3:35-64). Neither Barker470 nor Barker 695 explicitly teaches an example wherein the solvent comprises EC, PC, MEC and DEC.

However, Kuboki teaches a lithium battery comprising an electrolyte including a lithium salt and a solvent mixture. The mixed solvent may be EC, MEC, PC and DEC wherein MEC is preferably 30-80% of the mixture. The EC or PC is preferably 20-75% of the mixture (5:25-67).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the EC, MEC, PC and DEC mixed solvent of Kuboki for the electrolyte solvent of Barker470 in view of the teachings by Barker470 and Barker695 that the solvents may be selected from DEC, EMC, EC and PC (note EMC and MEC are equivalent).

*

Claims 21, 25-30, 34 and 38-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barker et al., US 6,723,470 ("Barker470") in view of Barker et al., US 5,643,695 ("Barker 695"), further in view of Kuboki et al., US 6,413,679 and further in view of Hwang et al., US 6,613,480.

Barker470 teaches a lithium battery comprising a positive electrode, a counter negative electrode, a separator and an electrolyte. The positive electrode comprises a lithium mixed metal phosphate compound having the formula $LiFe_{1-y}Mg_yPO_4$ (10:25-29). The compound $LiFe_{0.9}Mg_{0.1}PO_4$ is specifically disclosed (11:39). The compound $Li_3V_2(PO_4)_3$ is specifically disclosed (11:39-40). The electrolyte comprises any number of suitable solvents and lithium salts. Solvents are selected from diethyl carbonate (DEC), ethylmethyl carbonate (EMC), ethylene carbonate (EC) and propylene carbonate (PC). The salt may be $LiPF_6$. Desirable solvents and salts are described in US Patent 5,643,695 (Barker695) (13:3-18). Barker695 teaches a solvent mixture comprising EC and PC with one or more additional solvents included in the solvent mixture. The additional solvents may be MEC, DEC or a mixture of MEC and DEC (3:35-64). Neither Barker470 nor Barker 695 explicitly teaches an example wherein the solvent comprises EC, PC, MEC and DEC.

However, Kuboki teaches a lithium battery comprising an electrolyte including a lithium salt and a solvent mixture. The mixed solvent may be EC, MEC, PC and DEC wherein MEC is preferably 30-80% of the mixture. The EC or PC is preferably 20-75% of the mixture (5:25-67).

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the EC, MEC, PC and DEC mixed solvent of Kuboki for the electrolyte solvent of Barker470 in view of the teachings by Barker470 and Barker695 that the solvents may be selected from DEC, EMC, EC and PC (note EMC and MEC are equivalent).

Kuboki does not explicitly state the amount of propylene carbonate (PC) or diethyl carbonate (DEC) in the mixed solvent of EC:MEC:PC:DEC disclosed by Kuboki.

However, Hwang teaches an electrolyte for lithium batteries that includes a cyclic carbonate and at least two linear carbonates. The electrolyte includes 20-60% of cyclic carbonate (2:54-65) and 30-77.5% of linear carbonate (3:1-24). Hwang teaches ethylene carbonate is a preferred cyclic carbonate and both diethyl carbonate and ethyl methyl carbonate are preferred linear carbonates. Hwang discloses the cyclic carbonate may be any cyclic carbonate known in the related arts (2:54-65). Propylene carbonate is a cyclic carbonate.

Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because Hwang teaches using cyclic carbonates in a mixed electrolyte solvent in known. If the amount of cyclic carbonate is less than 20% an amount of lithium salts dissolved in the electrolyte is diminished. If the amount of cyclic carbonate is more than 60% the low-temperature characteristics of the battery deteriorate because cyclic carbonate has a high freezing point (2:54-65). Hwang teaches using linear carbonates in a mixed electrolyte solvent is known. If the amount of linear carbonate is less than 30% the effect of decreasing the viscosity and freezing point of cyclic carbonate is not induced. If the amount of linear carbonate is more than 77.5% the effect of decreasing the viscosity and freezing point of cyclic carbonate is induced too much and an adverse effect may be obtained (3:1-8). Thus, one of skill would have been motivated to vary the amounts of the cyclic carbonates and linear carbonates of Kuboki in order to balance the viscosity and freezing point properties of the mixed solvent, as discussed by Hwang. Furthermore, the courts have ruled where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA 1250, 156 F.2d 239, 70 USPQ 412. The courts have held that a limitation merely with respect to proportions in a

composition of matter or process will not support patentability unless such limitation is "critical". Minerals Separation, Ltd. v. Hyde, 242 U.S. 261 (1916). Furthermore, the courts have ruled that discovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).

Response to Arguments

Applicant's arguments filed 3/28/07 have been fully considered but they are not persuasive.

Applicant argues neither Barker470 nor Barker695 explicitly teaches a four component electrolyte solvent that would necessarily work with such cathode materials. Applicant states most of the solvent mixtures disclosed are two solvent systems and the preferred solvent systems discloses therein are two solvent systems. However, Kuboki teaches the four component electrolyte solvent limitation. Applicant argues Kuboki teaches cathode material which are metal oxide. However, Kuboki is not applied to teach the cathode material. The cathode materials are taught by Barker470 and/or Barker695. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). Applicant has not addressed the Examiner's motivation statement for combining the references.

Applicant argues it is not predictable that an electrolyte system used with a specified active material (oxide) will necessarily be useful in combination with other active materials (phosphates). It is unclear to the Examiner how this argument relates to the rejection of record.

Kuboki is not applied to teach the active material limitations. Kuboki is only applied to show that the solvents disclosed by Barker470 and/or Barker695 are known in the art to be in a single solvent mixture. Kuboki teaches a lithium battery comprising an electrolyte including a lithium salt and a solvent mixture. The mixed solvent may be EC, MEC, PC and DEC wherein MEC is preferably 30-80% of the mixture. The EC or PC is preferably 20-75% of the mixture (5:25-67). Therefore, the invention as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made because one of skill would have been motivated to use the EC, MEC, PC and DEC mixed solvent of Kuboki for the electrolyte solvent of Barker470 in view of the teachings by Barker470 and Barker695 that the solvents may be selected from DEC, EMC, EC and PC (note EMC and MEC are equivalent). Applicant has not addressed the Examiner's motivation statement for combining the references.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tracy Dove whose telephone number is 571-272-1285. The examiner can normally be reached on Monday-Thursday (9:00-7:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Pat Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

September 26, 2007

TRACY DOVE
PRIMARY EXAMINER